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Digital Product Perception and User Satisfaction Relationship: Can They Create Feedback Intention?

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Abstract. *Agile product development principles emphasize user collaboration and continuous improvement. It sometimes bothers users if they have less time, commitment and knowledge to become involved in the lengthy process of product development. Giving online feedback could be another way of contributing to product improvement. However, not all users are willing to leave reviews on online platforms. This study attempts to uncover the factors behind user feedback intention and the relationship between user roles in an agile approach. The questionnaire was completed by 113 respondents from all over Indonesia who have knowledge and experience in using digital products. The data was processed further by applying the PLS-SEM technique using the SmartPLS 3 application. The proposed model supported the positive influence of product perception on user satisfaction, and user satisfaction's positive impact on feedback intention. Product perception is the first-order construct of attitude and perceived usefulness; meanwhile, perceived quality is influenced by product perception. This study's theoretical contribution sheds light on the relationship between user satisfaction, perception and feedback intention. Moreover, it provides practitioners practical implications towards understanding how to gather user feedback to support the initial idea in product improvement using an agile approach.*

Keywords: *Agile product development, digital start-ups, feedback intention, product perception, user satisfaction.*

1. Introduction

The consistent studies to explain user roles in the product improvement process indicate the importance of user involvement (Cooper, 2019). There are many underlying reasons for this statement, one of which is the importance of acknowledging both user needs and solution providers by considering them both in the ideation process or when presenting feedback once the product has been launched (Chang & Taylor, 2016). Product improvement aims for a higher value in the market and greater business growth (Ehrenhard et al., 2017; Homfeldt et al., 2019).

Digital start-ups have extreme uncertainty levels, high capital requirements and fast product lead times (Oakey, 2015; Roberts, 1991). They require an iterative, incremental and rapid product development process, which is also notorious as agile product development (Tam et al., 2020). Generally, for firms that create software, adopting an agile product development process beneficial. One of the software's nature characteristics is easy and fast fixes which allows agile approach to be implemented (Patanakul & Rufo-McCarron, 2018).

The implementation of user feedback is positively linked to product performance improvement using the agile approach. However, users tend to only provide information that closely aligns with their goals and desires (Te'Eni, 1991). Their opinions are based on the circumstances they confront, which adds an element of human uncertainty to user feedback (Jasberg & Sizov, 2020). An online review is a form of explicit knowledge that users possess to provide feedback on the digital product they use (Jasberg & Sizov, 2020).

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There are two possible contributions to this study. First, we want to redefine users' roles in agile product development from the users' perspectives. Although it is widely known that an agile approach focuses on user feedback and input in the developmental process, most prior studies regarding this approach were rooted in the firms' perspectives (Bianchi et al., 2020; Nurdiani et al., 2019; Patanakul & Rufo-McCarron, 2018)

Second, we want to discover the factors that influence user feedback intention for a digital product. User participation is essential in the agile approach, yet this can be troublesome for users because of the high commitment without any real rewards (Otaduy & Diaz, 2017). Since users have utilized and formed a perception of the product, the reasons for providing feedback should be uncovered.

This study investigates the following critical research question: what are the user elements in agile product development? And how is the feedback intention of users awakened? We want to uncover the relationship between feedback intention, product perception and user satisfaction in agile product development conducted by digital start-ups. This study continues by outlining the conceptual background and hypotheses development, research methodology, results, discussion, contribution, and finally, it presents the conclusion.

2. Literature Review/ Hypotheses Development

This section contains an explanation of the agile product development process in digital start-ups. This clarifies the importance of feedback in the agile approach. Uncovering the relationships between product perception, user satisfaction and feedback intention is a must to better enable the users to provide feedback on digital products.

2.1. *Agile Product Development in Digital Start-ups*

Scholars have provided several definitions of start-up; Sutton (2000) said that it is an organization that has several challenges, particularly immaturity, resource scarcity, multiple influences, and rapidly changing technologies and markets. Steve Blank (2007) defined it as an organization's exploration of a scalable, repeatable and profitable business model. Meanwhile, Eric Ries (2011, p. 27) proposed that it is "a human institution designed to create a new product or service under conditions of extreme uncertainty". In the early stages of digital start-ups (Klotz et al., 2014), there are limited resources to respond to the rapid shift of market needs (Abouzeedan et al., 2013; Corral de Zubielqui & Jones, 2020). It is a volatile business environment that needs an agile approach to survive (Chan & Thong, 2009; Tam et al., 2020).

Agile manifesto was created by several prominent software experts to emphasise user satisfaction by conducting lightweight product development methodologies that deliver a product with minimum requirements as fast as possible, then continuously improve on them (Highsmith, 2001). Several principles were created to support their agile purpose, and the manifesto highlights user collaboration and product resilience (Beck et al., 2001). User involvement and continuous feedback are also two of the main influencing factors in agile practice success (Ochodek & Kopczyńska, 2018).

Examples of product development processes using the agile approach are Scrum, Adaptive Software Development, and Extreme Programming (Highsmith, 2001). They have similar basic principles with different strategies and tools. If a company chooses to utilize an agile approach in product development, the process, tools and documentation should be standardised and integrated into its values (Patanakul & Rufo-McCarron, 2018).

In the waterfall method, previously the most popular approach, the development time was used predominantly for documentation. The waterfall method came to be considered unadaptable to change, and as over-indicating

the customer involvement principle, since this interaction only occurred at the beginning and the end of a product development cycle. An agile approach requires continuous improvement, explaining the short iterative development cycle with small changes for each iteration. Thus, agile approach created new era and slowly rose and beat waterfall approach by the flexibility. However, due to agile user role principles, users feel pressured and overly committed to the product development process in its entirety. In other instances, they may have less time, motivation and knowledge to participate in such a weary and lengthy product improvement process (Otaduy & Diaz, 2017).

2.2. *Feedback in the Form of User Involvement in Agile Development*

User feedback is one form of user involvement, which is useful in the evaluation process and can be used as an initial idea to be developed for the next implementation in agile development (Liu et al., 2014). While in the beginning, a minimum viable product (MVP) is published using an online mobile application distribution platform as an overview of the application, user feedback can increase the quality of the product released by the digital start-up. It also minimizes the risk of product failure delivering the main feature to be tested to the market (Wijaya & Dhewanto, 2019).

Based on a study conducted by Lárusdóttir et al. (2014), user feedback is usually arranged structurally to express customer needs. It has inherent credibility that supports the product management team in prioritising and implementing formal feedback. However, because agile development has a short iterative cycle, informal feedback from several sources is obtained more often; for example, it can be obtained from users directly or in online reviews posted on any of several platforms. Otaduy and Diaz (2017) demonstrate that users are happy to be included in the entire product development process if there is a system that can offer a personalised schedule, information and help regarding the user needs and problems. It has been shown that users will use the opportunity to give feedback and reviews if the process is easy, if it suits their needs and, of course, if they feel comfortable doing so. As an online distribution service platform to engage with the product team offers these advantages, the chance for users to participate, particularly on feedback intention, is relatively high.

Online feedback from existing users plays an important role in product reputation, which can later influence other potential users to adopt the product. Furthermore, it contributes to future product innovation, incrementing the degree to which customer needs are satisfied. The online reputation platform becomes helpful by facilitating users to give feedback. Therefore, the online platform should be trustworthy and comfortable, encouraging the user to share their experience with a product (L. Chen et al., 2017; Ogink & Dong, 2019). Informal feedback is often implemented because it is easier to obtain (Lárusdóttir et al., 2014). The stress of submitting informal feedback is low, encouraging users to engage, particularly reporting on aspects of the product that they found to be problematic. A better version of the product can be delivered with changes addressing these problems because of the accumulated input in a short cycle. The product management team is purposeful and calculated when selecting and applying feedback.

Digital start-ups collect feedback from the digital product distribution service online platforms, such as Google Play Store in Android or Apple App Store in iOS mobile operating systems. These platforms can automatically prompt users to rate an application. Thus, users can easily leave a review or contact support if there is an issue. This technique is considered the easiest and most cost-efficient way of obtaining user feedback. After gathering feedback, the product team, ideally, validates the insight before proceeding to describe the practical future developed product and how the users will use the planned development since online

feedback only helps in the initial idea of product improvement (Patanakul & Rufo-McCarron, 2018).

2.3. *Relationships between Product Perception, User Satisfaction and Feedback Intention*

Users who leave feedback on the online platform must be individuals who have acquired the product and accepted the technology. Therefore, most of the variables are constructed using the Technology Acceptance Model (TAM), as this paper's primary focus is a digital product that uses software technology.

Product perception as a second-order construct (PP)

The product assessment depends on an individual's perspective (Zeithaml, 1988). Each individual perceives products in accordance to their background, experience and other elements as a human (Ramaswamy & DeClerck, 2018). When an individual has at least an opinion of a product, it means that he/she used the product and perceived it. Thus, the product perception is shown as a successful proof of technology product usage (Davis, 1985). Attitude and perceived usefulness from the TAM construct the product perception. It is also combined with perceived quality, as a recent study finds that it influences digital product utilisation (Akter et al., 2013; Sørum et al., 2012; Udo et al., 2010). Therefore, product perception is defined as the higher-order constructs consisting of attitude, perceived usefulness and perceived quality.

Attitude (AT)

Attitude is the result of the evaluation process of the emotional response to objects (Breckler, 1984). This process is influenced by recognising rational judgment, behaviour or experiences, and emotional factors; these all affect how one defines excellent and mediocrity, and they are possessed by everyone before, during and after product utilisation, as they are continually assessing their product.

Perceived usefulness (PU)

Perceived usefulness is founded on how people can use new technology or products in general (Davis, 1985). The definition of this construct is "the degree to which a person believes that using a particular system would enhance his or her job performance" (Jahangir & Begum, 2008, p. 33). Understanding how a technological product would benefit their daily activities leads users to perceiving it to be the right product.

Perceived quality (PQ)

Product quality is one of the most crucial product elements in the user's decision-making regarding customer retention (Udo et al., 2010). While prior studies focused on a new component to measure product success, particularly in digital products, perceived quality appeared as one of the components involving individuals' different perspectives depending on the experiences, knowledges, and such (Akter et al., 2013; Sørum et al., 2012; Udo et al., 2010). Therefore, it can be extracted that perceived quality is part of product perception.

User satisfaction (US)

The user compares the expected performance with the product's actual performance, determining satisfaction (Churchill & Surprenant, 1982). Most satisfaction theories are related to the purchasing decision and capturing the experience after purchasing the product (L. Wang et al., 2019). In a digital product, the satisfaction level is later redefined as the confirmation of a user's expectations of the product's value weighed against its technical issues (Finn et al., 2009).

Feedback intention (FI)

Feedback intention appears with the continuance of product usage. After using the product, users often develop a participatory attitude towards the product's improvement, which can lead to submitting ratings and online reviews on online platforms, sometimes embedded in a mobile device (Filieri, 2015). Then, the product team validates the insight from feedback and proceeds to implement this in the next product improvement phase.

The relationship between each construct

Prior studies explain the relationship between user satisfaction and product perception. A product's perception can lead to satisfaction (Finn et al., 2009; Udo et al., 2010). User perception can drive satisfaction regarding the products (Sreejesh et al., 2018). A comparison is made between the actual and expected performance. The initial product perception can serve as a standard, and it will largely determine users' satisfaction with a product.

H1: *Product perception influences user satisfaction*

It is important to understand the product perception from the user's perspective since user behaviour and intention influence several components associated with user perspective (Amoako-Gyampah, 2007; Davis, 1985). Although the existing theories only explain the behaviour intention of using technology products in general, feedback intention as one of technology post-usage behaviours is also included (Te'Eni, 1991). Moreover, it proposes that product perception influences feedback intention.

H2: *Product perception influences feedback intention*

Moderator variables are defined as the two variables' influential constructs. The influence includes the relationship direction between independent and dependent variables. (Baron & Kenny, 1986). Moderator variables strengthen the effect of the predictor variables on the dependent variable. This study assumes product perception to be a moderator of user satisfaction and feedback intention, although few existing studies can currently support that assumption. The intriguing premise is built considering the complicated interdependence relationships among variables (Akter et al., 2013).

H3: *Product perception has a moderating effect on the relationship between user satisfaction and feedback intention*

Having H1 and H3, as detailed above, user satisfaction creates a mediating effect from product perception to feedback intention. One study by Akter et al. (2013) corroborates that user satisfaction has a partial mediating effect. The perceived usefulness and quality of a product and the attitude of the users can increase or decrease their satisfaction based on their expectations and actual product performance. Depending on whether the product performance is highly satisfying or unsatisfying, users will leave a positive or negative review, respectively.

H4: *User satisfaction has a mediating effect between product perception and feedback intention*

The continuance intention level must be high to have high participation intention in the product's improvement process. The continuance intention is influenced positively by user satisfaction (Tran et al., 2019). Continuance intention further drives the customer's willingness to give feedback to the product development team. The expectation level can encourage users to leave feedback via online platforms. Feedback intention is impacted positively by user satisfaction.

H5: *User satisfaction influence feedback intention*

Based on the hypotheses, a conceptual framework is developed and illustrated in Figure 1.

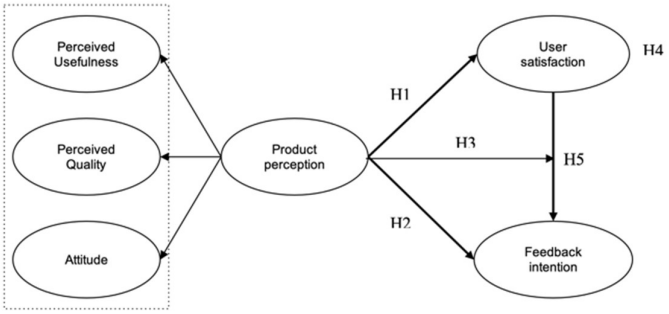

Figure 1.
Conceptual Framework

Prior studies explain the role of online reviews in product innovation (L. Chen et al., 2017; Ogink & Dong, 2019; Zhang et al., 2021). Meanwhile, these studies were concentrated on behaviour intention (Amoako-Gyampah, 2007; Davis, 1985; Udo et al., 2010). Because of the short supply of research explaining the aim of leaving reviews on online platforms, the specific feedback intention is sufficiently intriguing to warrant further exploration. Furthermore, the relationship between user satisfaction and perception was explained only literally (Finn et al., 2009; Sreejesh et al., 2018; Udo et al., 2010). They are often associated with other constructs, such as loyalty or behaviour intention (Finn et al., 2009; Udo et al., 2010). There are still limited studies that link them with a new construct: for instance, in this study, feedback intention. Thus, developing a new model between user satisfaction, perception and feedback intention would be phenomenal.

3. Methodology

This section describes the research approach used in the study and outlines the data collection process, respondent criteria (for empirical research) and analysis process.

3.1. *Data Collection and Sample*

Digital products in this study are defined as the start-up's technology products, which Indonesians use. Since user perspective becomes the main point, the target respondent is the digital product user. Approaching them in the least intrusive way possible was a key aspect of the study; using a survey to collect data was considered the easiest way to reach a significant number of respondents. Thus, the survey was taken online using Google Form.

The questionnaire was shared with online communities, such as university mailing lists and social media closed groups, consisting of moderately to highly educated participants. As the central focus was users of mobile phone digital products, respondent requirements were established. Participants were to be smartphones users and possess a degree of knowledge in using mobile applications. They also needed to share the information they were using through mobile applications, as it was relevant to our aim of exploring the agile approach for digital product development conducted by digital start-ups.

Most educated people use smartphones and mobile applications nowadays. The proposed research population is based on smartphone users in Indonesia, which accounts for 81.8 million people (Statista, 2020). The sample was taken from highly educated individuals, defined as university graduates, living in big cities to ensure smartphone and mobile application usage. Questionnaires were spread among online communities, comprising 5000 members, from which 113 respondents were willing to answer the questions. Their preliminary answers were evaluated on whether they were using the digital start-ups' products or not, and those who fulfilled the requirements passed on to the next stage. The response rate was 2.26%. Although the sample size appears small, it complied with the requirement of using PLS. The optimum sample size was determined based on 18 item measurements. According to Hair (2014), the minimum number of required responses for each question was 5 and the maximum was 10. Therefore, the required sample size was between 90 to 180, and 113 responses successfully satisfied the requirement.

The demography of the respondents was as follows. Of 113 respondents, 59% were male, and 41% were female. The difference was not overly unbalanced, concluding that the respondents were representative from Indonesia population which are 50.35% male and 49.65% female (Worldbank, 2020). Most respondents were 26–35 years old (58.4%), 17–25 years old (35.4%) and the remainder being 35–45 years old (4.4%) and 46–55 years old (1.8%). This reveals that the use of smartphones is most active among the young adult population. This corresponds with the fact that the smartphone was created and released nearly 30 years ago.

The majority of respondents were students and employees in the private sector: 39.8% and 38.9%, respectively. The remaining participants were civil servants, entrepreneurs, freelancers, housewives, and others, fulfilling the remaining 21.3%. The respondents also lived mostly in Java and Bali, accounting for almost 95% of the total number. These two findings fulfil the sample requirements of educated people who are resident in the cities.

Most people had utilized smartphone and mobile applications since they were young or in their teens. They had also downloaded more than 20 mobile applications on their smartphones, with only a small number of applications being used intensively. This indicated that the respondents had considerable knowledge in using digital products.

Table 1.
Respondent Demography

Description	Sub-description	Number of respondents	Percentage (%)
Gender	Male	67	59%
	Female	46	41%
Age (years old)	<17	0	0%
	17-25	40	35.4%
	26-35	66	58.4%
	36-45	5	4.4%
	46-55	2	1.8%
	>55	0	0%
Occupation	Student	45	39.8%
	Civil Servant	8	7.1%
	Private Sector	44	38.9%
	Entrepreneur	4	3.6%
	Others	12	10.6%
Residence	Sumatera	2	1.8%
	Java & Bali	107	94.7%
	Kalimantan	3	2.7%
	Sulawesi	1	0.8%
	Maluku/Papua/Nusa Tenggara	0	0%
Smartphone Usage (years)	<5	7	6.2%
	5-10	66	58.4%
	>10	40	35.4%
Number of mobile applications in the current smartphone	<5	1	0.8%
	5-10	21	18.6%
	10-15	19	16.8%
	15-20	17	15%
	>20	55	48.8%

Since ethical data collection was mandatory, and because the question list was mostly related to personal experience, there was an ethical form that the respondents needed to agree upon before completing the questionnaires (Newing, 2010). The ethics form consisted of these statements: (1) Respondents agree that the input data would be kept anonymous by the researcher; (2) Respondents agree to answer truthfully and based on their situation and experience; (3) Respondents agree that the given data would be accepted, processed and presented by the researcher; (4) Respondents agree that the

provided data would not be spread, except in the process of obtaining results relevant to the proposed research; (5) Respondents agree that the research result would be documented as publication, both in conference and journal; and (6) Respondents agree that the data they provided would be saved for a maximum of three years after the researcher accepted the information.

It was vital for the respondents to agree upon the ethical statement before they started to fill out the questionnaire. If they agreed with all the above-mentioned ethical statements, then they to continue with the questionnaire. By first getting the participants to accept the terms of the ethical statements, we ensure the safety of processing the data obtained to achieve the proposed research goals.

3.2. *Development of Instrument*

Since the observation constructs were latent variables, item measurements were developed to express the respondents' experiences in using digital products. A 4-point Likert scale was used to encourage respondents to convey their feelings explicitly without any sensible choice (Weijters et al., 2020). The exact feeling could be portrayed by using fewer scales (Vonglao, 2017).

There are three constructs with several instruments. The first construct is product perception, which asked the respondents about their perceived usefulness of a product (Bhattacherjee, 2001; Ramos de Luna et al., 2018; Schierz et al., 2010; Yang & Yoo, 2004), attitude (Ramos de Luna et al., 2018; Schierz et al., 2010; Yang & Yoo, 2004) and perceived quality (Lu et al., 2009; Ramos de Luna et al., 2018; Schierz et al., 2010; Venkatesh & Davis, 2000). The second construct is user satisfaction (C.-F. Chen & Wang, 2016; Jiang et al., 2019). The last construct is feedback intention (C.-F. Chen & Wang, 2016). This is explained more comprehensively in Table 2.

Table 2.
Constructs and measurements

Construct	**Item code**	**Item measurement**	**Reference**
Product perception (PP)			
Attitude (AT)	AT1	It is a good idea to use the mobile application	Yang and Yoo (2004); Schierz et al. (2010); de Luna et al. (2019)
	AT2	It is convenient to use the mobile application	
	AT3	It is beneficial to use the mobile application	
	AT4	It is interesting to use the mobile application	
Perceived Usefulness (PU)	PU1	The mobile application is beneficial to my daily activities	Bhattacherjee (2001); Schierz et al. (2010); de Luna et al. (2019)
	PU2	Using the mobile application makes my activities easier	
	PU3	The mobile application permits me to have quick use in my activities	
	PU4	I believe that the mobile application increases my decision quality	

Table 2. (Continued)
Constructs and measurements

Construct	Item code	Item measurement	Reference
Perceived Quality (PQ)	PQ1	I use the mobile application now because of its quality	Venkatesh & Davis (2000); Schierz et al. (2010); de Luna et al. (2019); Lu et al. (2009)
	PQ2	I had already known the quality of the mobile application before I used it	
	PQ3	The quality of the mobile application is as I expected	
User satisfaction (US)	US1	I love using the mobile application	Chen & Wang (2016); Jiang et al. (2019)
	US2	The mobile application satisfies my needs	
	US3	I take great pleasure to participate in making the mobile application better	
	US4	Overall, the mobile application has met my expectations	
Feedback intention (FI)	FI1	I was asked to give my feedback to improve a mobile application by PlayStore (Android) or AppStore (iOS)	Chen & Wang (2016)
	FI2	I voluntarily give feedback via PlayStore (Android) or AppStore (iOS) to a mobile application	
	FI3	My feedback to the product was being considered and implemented in the next release of the mobile application	

3.3. *Analysis Approach*

The Partial Least Square-Structural Equation Model (PLS-SEM) was chosen as the analysis technique because of the exploratory nature of this study, and this approach allows to test in the early stages of theory building (Hair et al., 2014; Lahindah et al., 2018). With PLS, a small sample size can be used to create and assess models consisting of latent constructs with the same principle of structural equation modelling (Lee, 2012). The research objective is to examine the nature of the connections between the variables; the relationship is the matter to be explored (Hair et al., 2014). The model will be tested using the SmartPLS 3 desktop application, as its trustworthiness is well established (Assegaff, 2016). Once the data assumption is confirmed and the hypotheses are proven, the relationship will be revealed to create a contribution. SmartPLS was utilized to analyse the data. Following the guidelines for an efficient algorithm set by Hair (2014), the path weighting scheme was selected, with a maximum of 300 iterations at the stop criterion of 1×10^{-7}. To assess the structural model, we also utilised the bootstrapping mode using the default settings of 500 subsamples and performed parallel processing. The bootstrapping settings were adjusted to bias-corrected and accelerated (BCa) bootstrap as the confidence interval method, using two-tailed test type and a significance level of 0.05.

4. Findings and Discussion

4.1. *Measurement Model Evaluation*

Assessment of the second-order model

The construct creation of reflective product perception (PP) consists of three first-order components: perceived quality (PQ), perceived usefulness (PU) and attitude (AT).

One item measurement of PQ, PQ3, is deleted because its factor loadings were found to be below the acceptable range of 0.7 (Hair et al., 2014). Therefore, there are only two reliable items for PQ. However, in product perception as the first-order construct, the PQ1 and PQ2 loadings are both below 0.5, which means they are not compatible with the product perception factor, which suggests they should be deleted (Hair et al., 2014). It also influences the average variance extracted (AVE) of product perception, which is 0.461, below the acceptable range. Therefore, the item measurements of perceived quality are deleted from the first-order construct to enhance the product perception's validity. This pushes perceived quality to be another first-order construct influenced by product perception. After being deleted, the AVE and CP of the product perception became 0.558 and 0.909, respectively, which is above the required value to be considered valid. This forms a conceptual second-order model that is different from the theoretical model, resulting in a product perception that only considers perceived usefulness and attitude. The result is presented in Table 3 and Figure 2.

Table 3.
Validity and Reliability

Construct	**Item code**	**Factor loadings**	**Composite Reliability (CR)**	**Average Variance Extracted (AVE)**
Attitude (AT)	AT1	0.789	0.881	0.649
	AT2	0.756		
	AT3	0.844		
	AT4	0.833		
Perceived Usefulness (PU)	PU1	0.864	0.928	0.763
	PU2	0.88		
	PU3	0.861		
	PU4	0.889		
Perceived Quality (PQ)	PQ1	0.861	0.805	0.674
	PQ2	0.78		
User satisfaction (US)	US1	0.861	0.881	0.65
	US2	0.849		
	US3	0.726		
	US4	0.782		
Feedback intention (FI)	FI2	0.883	0.871	0.772
	FI3	0.874		

Furthermore, in contrast with the acceptable result of the model assessment in PLS to ensure validity and reliability, the relationship between the second-order construct and its first-order constructs should have a strong correlation; the square root of correlation cross-loadings are discussed in the next section.

Assessment of the first-order model

The relationship between product perception (PP), user satisfaction (US) and feedback intention (FI) is corroborated by the data analysis technique provided in Table 2. For the convergent validity, FI1 was deleted because the factor loading falls below 0.7. This is also supported by the AVE values and composite reliability (CR) above the standard, 0.5 and 0.7, respectively. This proves the validity and reliability of all the item measurements and constructs of the model.

The correlation between each construct is low, as presented in Table 4. This suggests the

nomological validity of the model. The square root of the AVE of each construct is more significant than the correlation between the inter-constructs shown in Table 5. The Fornell–Larcker Criterion was used to analyse the discriminant validity of the constructs. The other approach outlined in Table 6 consists of examining the cross-loadings between items and constructs and indicating whether the construct's loadings are at least 0.1 higher than loadings featured in other constructs. Thus, it can be concluded that discriminant validity was achieved.

Table 4.
Correlation of the constructs

	AT	PU	PQ	US	FI
AT	1				
PU	0.588	1			
PQ	0.359	0.19	1		
US	0.700	0.401	0.385	1	
FI	0.169	-0.028	0.258	0.273	1

Table 5.
Fornell-Larcker Criterion

	AT	PU	PQ	US	FI
AT	0.805				
PU	0.588	0.874			
PQ	0.359	0.19	0.821		
US	0.700	0.401	0.385	0.806	
FI	0.169	-0.028	0.258	0.273	0.878

Table 6.
Cross Loadings

	AT	PU	PQ	US	FI
AT1	**0.605**	0.863	0.21	0.372	-0.078
AT2	**0.463**	0.88	0.181	0.34	0.039
AT3	**0.486**	0.861	0.156	0.394	-0.001
AT4	**0.49**	0.89	0.113	0.293	-0.052
PU1	0.801	**0.517**	0.089	0.482	0.071
PU2	0.744	**0.312**	0.379	0.658	0.181
PU3	0.852	**0.65**	0.226	0.494	0.079
PU4	0.821	**0.359**	0.508	0.664	0.24
PQ1	0.339	0.17	**0.872**	0.361	0.193
PQ2	0.241	0.139	**0.766**	0.262	0.239
US1	0.609	0.385	0.353	**0.861**	0.231
US2	0.634	0.315	0.306	**0.849**	0.128
US3	0.463	0.264	0.269	**0.727**	0.301
US4	0.542	0.319	0.307	**0.782**	0.228
FI2	0.118	-0.078	0.2	0.23	**0.89**
FI3	0.182	0.034	0.256	0.251	**0.867**

4.2. *Structural Model Evaluation*

The existence of collinearity was determined using VIF, which is shown in Table 7. All values range between 1 and 2.717, which are lower than the 3.30 maximum value to configure collinearity (Hair et al., 2014). Therefore, it is safe to assume that there is low collinearity between each other.

Table 7.
Collinearity using VIF

	PP	**AT**	**PU**	**PQ**	**US**	**FI**
PP		1	1	1	1	2.717
AT						
PU						
PQ						
US						1.643
FI						

Figure 2 and Table 8 explain the structural model and the related findings. As defined in the assessment of the second-order model above, PQ is not part of PP. However, there is a significant influence from PP to PQ. Meanwhile, PU and AT are the first-order constructs of PP, proven by the high path coefficients and high significance level between their relationship.

Table 8.
Path Analysis (: p<.05; **: p<.01; ***: p<.001)*

Constructs	**Path Analysis**	**Standard Error**	**t values**	**Hypothesis**
Product perception -> Attitude	0.892***	0.022	40.165	first and second-order constructs
Product perception -> Perceived usefulness	0.89***	0.043	20.597	first and second-order constructs
Product perception -> Perceived quality	0.317**	0.106	2.984	first and second-order constructs
Product perception -> User satisfaction	0.625***	0.103	6.09	H1 (supported)
Product perception -> Feedback intention	-0.15	0.171	0.876	H2 (not supported)
Moderation effect -> Feedback intention	0.006	0.119	0.052	H3 (not supported)
Product perception -> User satisfaction -> Feedback intention	0.227*	0.088	2.592	H4 (supported)
User satisfaction -> Feedback intention	0.364**	0.131	2.766	H5 (supported)

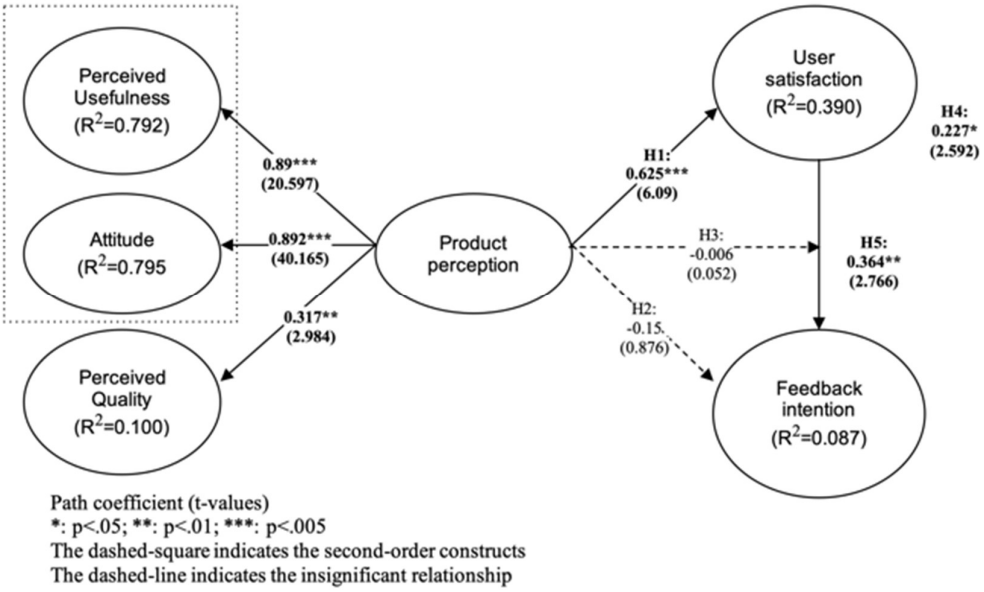

Figure 2.
Result of Path Analysis Model

The findings distinctly uncover the relationship between PP-US-FI. First, it was found that H1, H4 and H5 are supported by high path coefficients and significance level. PP positively influences US, and US positively influences FI. This also supports H4 in that US is the mediating variable of PP and FI. It can be concluded that US has full mediating influence as H2 is not supported. PP does not correlate directly with FI, and PP and does not moderate the relationship between US and FI. H2 and H3 did not have significant p-values. US has a direct relationship with FI.

4.3. *Discussion*

The findings have successfully proven that product perception is influenced by perceived usefulness and attitude. It is powerfully relevant to the theory of Technology Acceptance Model by Davis (1985), explaining the relationship between perceived usefulness, attitude and perceived ease of use as the variables under user perception. Moreover, the theory also explains their influence on each other. However, this study does not relate one construct to another. It focuses only on how they act together in developing the "product perception" construct. Thus, product perception consists of perceived usefulness and attitude.

Although prior research stated that perceived quality is one of the constructs in the lower order of product perception, the findings did not support this. Product perception influences perceived quality. It suggests that perceived usefulness and attitude affect perceived quality. This can be related to other studies that explain the relationship of perception to quality (Sørum et al., 2012).

The user perspective, which can mould product perception, may vary with the quality of the product. Product quality is best assessed by experts or users with high knowledge of the digital product. It further explains product perception influencing perceived quality. It supports the benefit of the feedback to the agile product development team.

The theoretical framework develops the hypotheses surrounding three variables: product perception, user satisfaction and feedback intention. Based on the findings, three of five hypotheses are supported. Together they explain the relationship of product perception and user satisfaction, user satisfaction and feedback intention, and prove user satisfaction's role as a mediator.

This is different from the result of another study (C.-F. Chen & Tsai, 2008), which states that perception influences satisfaction and loyalty, yet satisfaction and loyalty have no relation to each other. The differences are due to the level of skills with technology required to use the products. In this study, respondents were required to have a degree of knowledge and experience using mobile devices. In contrast, the other study focussed on television as their product, which was more generally used and could be applied to almost all people since its utilisation was not as complex as a mobile device.

Another reason behind the user satisfaction acting as the mediating variable is related to the feedback intention. People who leave reviews on online platforms generally do so when their experience with the product exceeds their expectations, or, in other cases, because they faced problems with the product that made for a frustrating experience. The perception of the products they initially form is used to confirm or disconfirm their expectations; this is done with the intention of leaving feedback for the product's developers to improve said products. This aligns with the results of this study. Meanwhile, product perception is not directly related to feedback intention, be it as a straight predictor or as a moderator variable. A user must first decide whether they are satisfied with a product before making choosing to leave a product review. This is understandable from the user's point of view. They often have expectations for the product to resolve their problems even before they start using it. The digital products must go beyond user expectations for them to leave positive remarks; surpassing expectations can increase their determination to help in the development and improvement of a product. This can be achieved by participating in the provision of feedback in convenient online platforms (Filieri, 2015; Qi et al., 2016; F. Wang et al., 2018).

It can also go the opposite way; if the product does not solve the user's problems or if it adds to user frustration through technical issues, users may not feel motivated to contact the product's development team to voice their opinion, displeased as they may be. In the instances they do leave decide to leave a review, they will speak negatively of the product. Somehow, this can be as effective as leaving reviews on development teams' social media, as both are public and can influence other users' behavioural usage intention (Filieri, 2015; Qi et al., 2016; F. Wang et al., 2018).

5. Conclusion

The reputation of digital products is valuable to product success. Online reviews from existing users form a significant part of this reputation. This should be considered when creating products to encourage users to leave the best remarks and perception. The influence of product perception on user satisfaction can further increase a user's intention to leave feedback on online platforms.

Two research questions were outlined at the beginning of this article: (1) What are user elements in agile product development? (2) How is the feedback intention of users awakened? We found that the user elements of agile product development are feedback intention, user satisfaction, perceived quality and product perception, with the product perception consisting of perceived usefulness and attitude. Furthermore, the study uncovers the influence of user satisfaction on feedback intention, and user satisfaction is awakened by product perception.

This contributes to the theory by including feedback intention and its relationship with product perception and user satisfaction in technology acceptance, particularly when using an agile approach. Product perception also influences the product's perceived quality. User perspectives play a role in all constructs as they are crucial for marketing and product development fields.

Digital start-ups are implementing agile product development, gaining knowledge on how to manage user feedback, particularly in online platforms, such as Google Play Store and Apple App Store. Digital products need user reviews, as they are crucial in developing a reputation among potential users. Therefore, to encourage existing users to leave reviews, product development teams are expected to create products that exceed user expectations in terms of usefulness, attitude and quality, to increase user satisfaction. Meanwhile, a product that underperforms can result in negative reviews. The product team should give fast responses to such feedback by applying agile product development.

The limitation of this study can provide ideas on what gaps to cover for future research. First, since perceived quality is not a second-order construct of product perception and prior studies show it to be related to user satisfaction, a prospective study could prove the relationship between perceived quality and user satisfaction. Second, there are many studies about product perception and its lower-order constructs, which should be considered in future studies to explain product perception elements, particularly in digital products. Third, this study could be conducted with a more comprehensive sample; for example, the definition of digital products could be narrowed down by working with products that meet specific criteria. Fourth, the description of participation should be greater than solely online reviews, i.e., those directly involved in the product improvement process. Moreover, assessing whether the feedback impacts agile product development from developers' perspectives could provide valuable insights. Lastly, other metrics from digital distribution service platforms should be acquired and analysed (i.e., total downloads, total uninstalls) to assess their effect on agile product development.

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